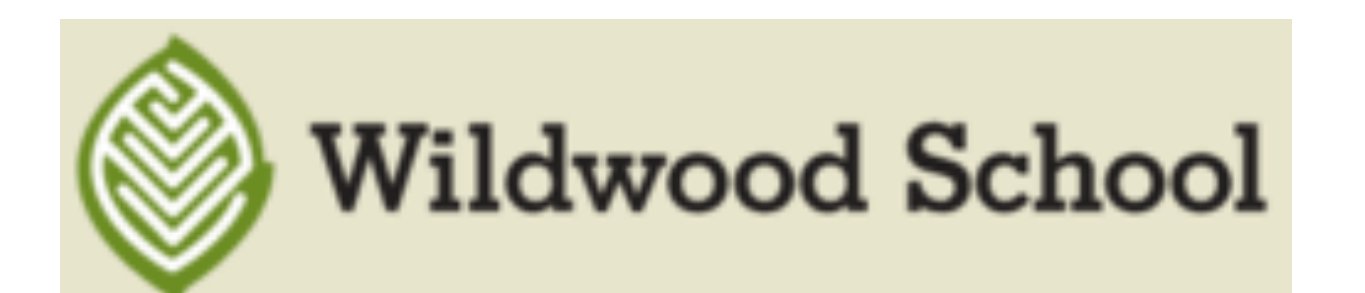




Metal-doped Xerogel Encapsulation



Presented by: Dylan Hardy and Cole Emhoff

Abstract Statement

Xerogel is a solid formed from a gel by drying with unhindered shrinkage. Xerogels usually retain high porosity (25%) and enormous surface area, along with very small pore size. Xerogel encapsulation is an attractive method of encapsulating metal oxides so they retain properties and biological activity. This can be useful in the creation of captors for supercapacitor . These capacitors can be used in the next generation of electric cars.

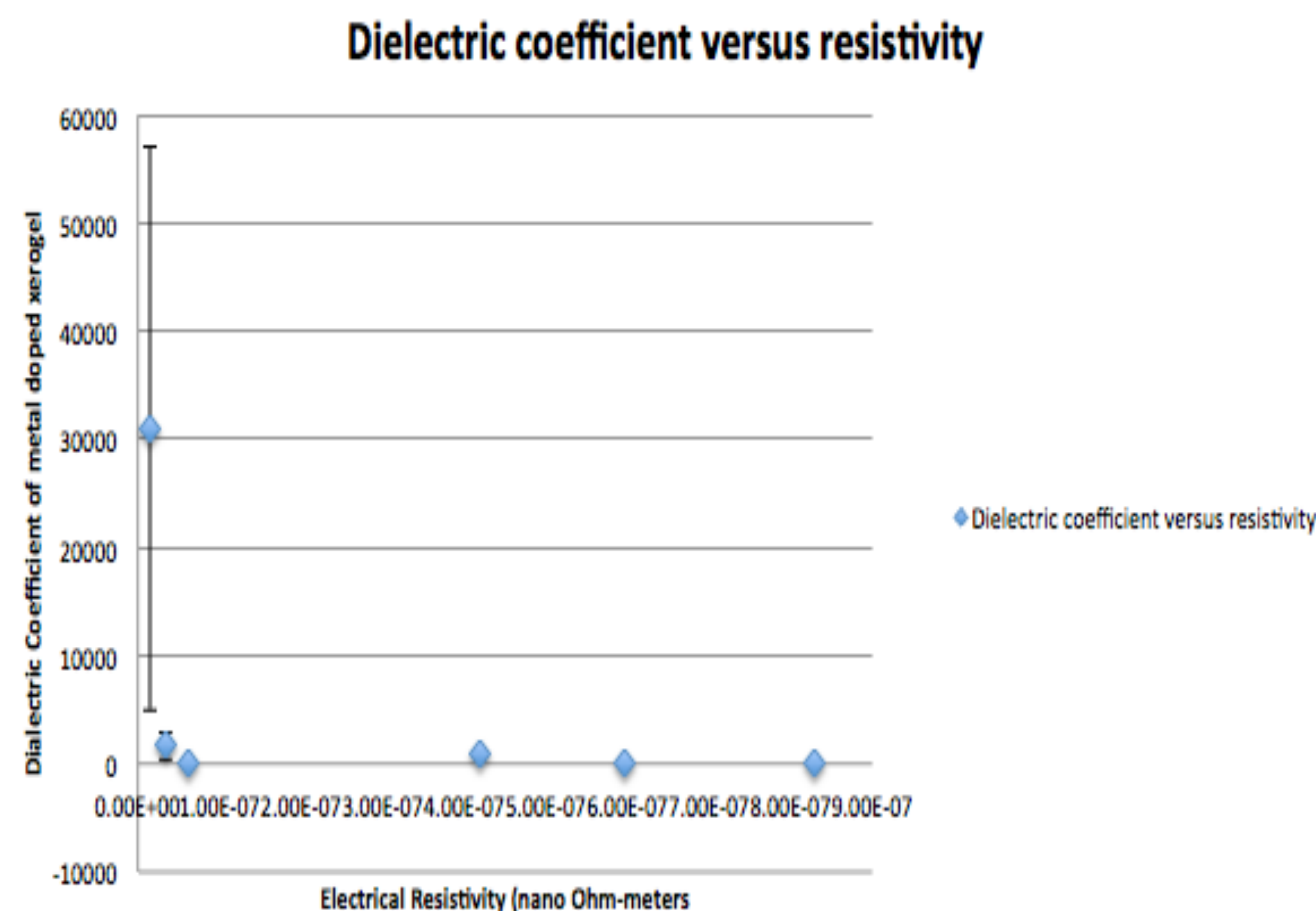
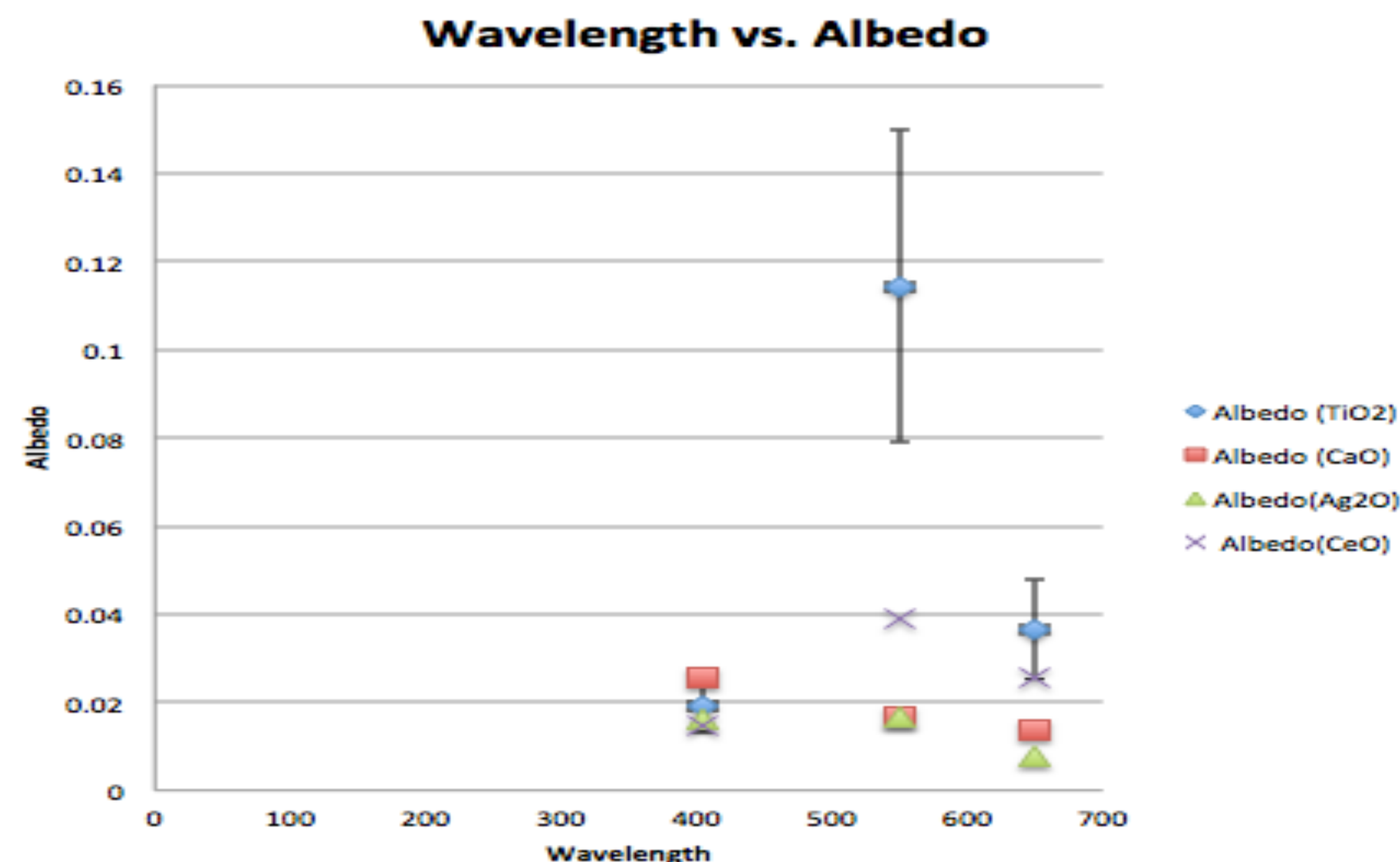
Experimental Setup

Gelling Process

In Order to create Xerogel certain elements must be mixed together. The form of xerogel used in the testing was silica xerogel. The gel was created by mixing 4.44 mL of Tetraethyl Orthosilicate, 4.66 mL of Ethanol, 1 mL of Hydrochloric Acid, and 1.44 mL of Water for every batch made. This was then combined with the metal oxide that was to be tested. When the solution was created, it is then put on a nutator. It will nutated for a week until the solution formed a glass like compound. During this time all the gasses would have outgassed from the solution leaving the xerogel.

Testing the metal oxides was done by measuring the capacitance of the gel and measuring it against its theoretical value. We also took found the Albedo of the gels created.

Data



What to Do Next

The next thing to to would be to continue creating and testing and creating different Metaloxide Xerogels. The goal is to create a Xerogel with a very high capacitance and maintain the material properties of its source oxide. This process will continue until a gel with optimal properties is formed.

References

The Chemical Rubber Company. Handbook of Chemistry and Physics. Cleveland, Ohio: Chemical Rubber, 1913. Print.